EXHIBIT 65

Lorrie L. Marchant, CSR# 10523, RMR, CRR, CCRR, CRC
EXHIBIT 54
WITNESS: Crescentia Brown
CASE: OBOT v. City of Oakland
CASE NO.: 3:16-cv-07014-VC
DATE: Tuesday, August 22, 2017

Message

From: Tim Rimpo [TRimpo@esassoc.com]
Sent: 6/17/2016 5:28:14 PM
To: Victoria Evans [VEvans@esassoc.com]
CC: Cory Barringhaus [CBarringhaus@esassoc.com]
Subject: RE: PRIVILEGED & CONFIDENTIAL: Admin Draft #2
Attachments: 05-Health Effects_ 061616_AD#2 for city_ETR Comments.docx

Here are my comments on Chapter 5, including revisions to the emission tables.

From: Victoria Evans
Sent: Thursday, June 16, 2016 2:39 PM
To: Tim Rimpo
Cc: Cory Barringhaus
Subject: FW: PRIVILEGED & CONFIDENTIAL: Admin Draft #2

Here are the two files for your review.

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PRIVILEGED & CONFIDENTIAL ATTORNEY WORK PRODUCT / ATTORNEY-CLIENT COMMUNICATIONS

CHAPTER 5
Health Effects

5.1 Overview

This section addresses the health effects of the ~~export~~ handling, and storage, and transloading of coal and/or petcoke from the proposed new Oakland Bulk and Oversized Terminal (OBOT) at~~upon~~ the project site and upon ~~the boundary line with~~ adj~~acent~~ neighbors. This analysis would apply to any facility which proposes such activities. ~~However,~~ ESA has ~~also~~ analyzed the ~~proposed new Oakland Bulk and Oversized Terminal~~ (OBOT) facility as just one illustrative example of such a facility.

Comment [JS1]: True?

Expected activities associated with the OBOT include rail transport of petcoke in open rail cars to the Port Railyard, staging of trains in the Port Railyard, travel along the new railroad spur from the Port Railyard to the OBOT Terminal for unloading, conveyor transfer to storage facilities and conveyor transfer to ships for export.

5.2 Coal

Emissions during operation of the proposed facility have been estimated for fugitive coal dust emissions. Fugitive dust emission sources evaluated in this analysis include uncovered railcars transporting coal along the mainline rail route, while waiting at the Port Rail ~~Facility~~yard, and traveling along the local spur track, the partially enclosed railcar transfer building, the enclosed conveyor transfer points, the enclosed storage pile, and ship loading. Each of these emissions estimates is discussed in separate sections below.

1) Mainline Rail Transport

2) Staging at Port Railyard and Transport on Rail Spur to OBOT

3) Unloading, Storage, Transfer, Transloading at OBOT

Emissions estimates ~~that ESA~~ provided by ESA are ~~each~~ based on the methods noted along with the U.S. Environmental Protection Agency (EPA) emissions estimation methodology contained within AP-42, *Compilation of Air Pollutant Emission* Factors (EPA 2006, EPA 2009).[1][2]

[1] EPA, 2006. AP-42, *Compilation of Air Pollutant Emission Factors, Chapter 13.2.4 and 13.2.5.* Available at: https://www3.epa.gov/ttn/chief/ap42/ch13/index.html. Accessed June 3, 2016.

[2] EPA, 2009. Emission Factors for Locomotives. Available at: https://www3.epa.gov/nonroad/locomotv/420f09025.pdf. Accessed June 3, 2016.

Appropriate particulate matter (PM) control efficiencies have been applied to the estimates based on statements by the Project Proponent for control measures that are proposed and described above in Section 2.

5.2.1 Mainline Rail Transport

5.2.1.1 Overview

Based upon the analyses in Section 2, ESA found that Project Proponent's proposed use of covers for rail cars or alternatively, dust suppressants (surfactants), represent currently unproven methods for controlling fugitive coal dust from rail cars during the entire duration of the mainline rail trip from a Utah mine to arrival at the OBOT Terminal in West Oakland. Thus, ESA is unable to determine that fugitive coal dust emissions from rail transport will be controlled. In the analysis below we have estimated the anticipated uncontrolled emissions of fugitive coal dust that would occur at the project site and in West Oakland and southern Emeryville.

5.2.1.2 Fugitive Dust from Rail Car Transport

Here we provide two estimates for coal dust generation from rail transport of uncovered coal in bottom unloading rail cars with no fugitive dust mitigation. One estimate is from a public commenter using a railroad industry factor (BNSF)[3] for estimating coal dust generation from rail transport;[4] the other is an estimate by ESA that is based upon rail industry factors along with the most recent information available in the Project Proponent's BoD.

In the next section, emissions are also estimated for the fugitive coal dust from rail cars awaiting unloading and during the local trips of the 26-car portions of the unit train from the Port Railyard on the spur line to the OBOT unloading facility.

For fugitive coal dust emissions from the mainline rail transport of coal to Oakland from Utah, the public commenter's analysis yielded an estimate[5,6] of 68,500 tons per year of fugitive coal dust that could be released from uncovered rail cars along the train route during the approximately 750 mile long rail trip from Utah to West Oakland. Assuming the uncovered unit coal trains enter California at Donner Pass on the mainline of the northerly rail route to Oakland,

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[3] A representative of BNSF testified before the Rail Energy Transportation Advisory Committee (RETAC) that coal loss from an uncovered bottom unloading car during a typical 400 mile trip is on the average of 45 lb from the bottom and 600 lb from the top, for a total of 645 lb of dust per car. Minutes, Rail Energy Transportation Advisory Committee, September 10, 2009. [HYPERLINK "https://stb.dot.gov/stb/docs/RETAC/2009/September2009/Minutes%209-10-09.pdf"]. Cited in Letter dated Sept. 21, 2015 from EarthJustice, Exhibit B – Environmental, Health and Safety Impacts of the Proposed OBOT by P. Fox, PhD, PE. And in Exhibit C – Technical Memorandum: Air Quality, Climate Change and Environmental Justice Issues from Oakland Trade and Global Logistics Center by Sustainable Systems Research, LLC by Prof. D. Niemeier; D. Rowangould, PhD and M. Eldridge (OAK055094).

[4] ~~A representative of BNSF testified before the Rail Energy Transportation Advisory Committee (RETAC) that coal~~

[5] Coal dust calculation used by public commenter: Assuming for total distance from Utah to Oakland, CA (645 lbs/rail car x 750 mi/400 mi x 104 cars/unit train x 3 trains/week x 52 wks/yr)/2000 lbs/ton. Letter dated Sept. 21, 2015 from EarthJustice, Exhibit B – Environmental, Health and Safety Impacts of the Proposed OBOT by P. Fox, PhD, PE. (OAK055094).

[6] OBOT operating parameters (OAK055267)) of estimated coal throughput of 5 million metric tons per year and 350 working days.

for the 200 mile portion of the route within California, this commenter estimated that about 27% ~~or 2,616 18,300 tons~~ of the coal dust (or 18,300 tons) would be released within the state.

To compare, ESA ~~performed an additional calculation using~~used ~~a rail industry factor from~~ Norfolk & Southern fugitive dust emission factor ~~for fugitive dust emissions~~ from coal- carrying rail cars. That factor is based ~~upon~~ on ~~measurements during~~ field study measurements ~~ies~~ of similar coal types and characteristics as bituminous coal (potential commodity at OBOT).[7] Along with a different assumption regarding unit train frequency, use of the Norfolk & Southern coal dust emissions rate (1 pound per rail car per mile) yields an estimate of coal dust emissions that differs from the commenter's. Both of these estimates are provided below in Table 5-1. These results represent an expected range of fugitive coal dust emissions from uncovered rail cars that would be expected to be deposited within California, the BAAQMD, West Oakland, ~~and~~ southern Emeryville (based upon the northern rail route ~~ad~~ trip length), and San Leandro.

The distance of ~~For~~ the northern rail route from the City of Oakland boundary to West Oakland ~~, the distance~~ is about 3 miles. ESA estimates that about 68 tons per year from open coal cars would be released during the approximately 3- mile train trip to the new Port Railyard, a trip ~~which~~ that transits through and terminates in West Oakland. This equates to estimated emissions in West Oakland of about ~~374~~ 453 lbs per day of fugitive coal dust, of which about 65 tons per year or ~~26~~ 32 lbs per day would be attributable to $PM_{2.5}$. For the 1-mile trip through the southern portion of the adjacent neighboring city of Emeryville, about ~~20~~ 35 tons per year of fugitive coal dust (total suspended particles or TSP) ~~is estimated to be released~~ can be expected; of this, about ~~11~~ 14 lbs/day would be $PM_{2.5}$ emissions.

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[7] Simpson Weather Associates Inc., 1993. *Norfolk & Southern Rail Emission Study*. In Virginia Senate Document No. 58, Report of the Joint Subcommittee Studying Ways to Reduce Emissions From Coal-Carrying Railroad Cars dated 1994. http://leg2.state.va.us/dls/h&sdocs.nsf/By+Year/SD581994/$file/SD58_1994.pdf

Table 5-1 . Estimated Fugitive Coal Dust Emissions From
Open Rail Cars During Transport From Utah to the Port Railyard, Oakland, CA
for Delivery at OBOT

			tons per year			lbs per day		
Coal dust emission factor source	Trip Description	Approximate Trip length (mi)	Total Suspended Particulates (TSP)	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
BNSF	California*	200	18,300					
Norfolk & Southern**	California	200	5,460	2,566	385	30,166	14,178	2,187
	BAAQMD	77	2,102	988	148	11,614	5,459	819
	West Oakland	3	82	39	6	453	213	32
	Emeryville	1.3	35	17	3	196	92	14
	San Leandro	3.6	98	46	7	543	255	38

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*Calculation in Letter dated Sept. 21, 2015 from EarthJustice, Exhibit B – Environmental, Health and Safety Impacts of the Proposed OBOT by P. Fox, PhD, PE. (OAK055094). Calculation based on 3 trains per day and 3% loss of coal during transit.
** ESA estimate using industry dust factor and based on 3 train arrivals every 2 days and 350 working days (OAK055267).

Comment [DS2]: Updated emissions in Table 5-1 and text to reflect 3 trains every 2 days for 350 days.

~~Table 5-1 . Estimated Fugitive Coal Dust Emissions From~~
~~Open Rail Cars During Transport From Utah to the Port Railyard, Oakland, CA~~
~~for Delivery at OBOT~~

			~~tons per year~~		~~lbs per day~~		
~~Coal dust emission factor~~	~~Trip Endpoint~~	~~Approximate Trip length (mi)~~	~~Total Suspended Particulates (TSP)~~	~~$PM_{2.5}$~~	~~TSP~~	~~PM_{10}~~	~~$PM_{2.5}$~~
~~BNSF~~	~~California*~~	~~200~~	~~18,300~~				
~~Norfolk & Southern**~~	~~California~~	~~200~~	~~4,545~~	~~320~~	~~24,906~~	~~11,706~~	~~1,756~~
	~~West Oakland~~	~~3~~	~~68~~	~~5~~	~~374~~	~~176~~	~~26~~
	~~Emeryville~~	~~1.3~~	~~29~~	~~2~~	~~162~~	~~76~~	~~11~~
	~~San Leandro~~	~~4~~	~~91~~	~~6.4~~	~~498~~	~~234~~	~~35~~

~~*Calculation in Letter dated Sept. 21, 2015 from EarthJustice, Exhibit B – Environmental, Health and Safety Impacts of the Proposed OBOT by P. Fox, PhD, PE. (OAK055094).~~
~~** ESA estimate using industry dust factor and based on 3 train arrivals every 2 days and 350 working days (OAK055267).~~

If a southerly rail route to OBOT were used by the unit trains, then the train would pass for about 4 miles through San Leandro. During the transit of the coal filled rail cars, for the trip through a

portion of of San Leandro, about 91 tons per year of fugitive coal dust (total suspended particles or TSP) is estimated to be released; of this, about 35 lbs/day would be $PM_{2.5}$ emissions.

Re-entrainment of Coal Dust.

The emissions of coal dust into the rail corridor and subsequent wind erosion causes re-entrainment or resuspension of the dust in the wakes of moving trains and during wind events. Public commenters mentioned this impact in general.[8] ESA includes this specific qualitative consideration of these additional contributions to local particulate levels. This accounts for the impact of the cumulative ~~amount of~~ fugitive coal dust that is deposited and then wind blown and resuspended (or re-entrained) by rail activity and local winds. The propensity for coal dust to be deposited and resuspended in a rail corridor, rail spur or railyard has been found to depend on the following factors and circumstances:

• Properties of coal being transported

• Air speed during transport (both ambient wind speed and the air speed induced by train movement)

• Rail corridor capacity and utilization

• Transport distance

• Precipitation at mine sites and along the transport route

• Coal dust management practices applied at loading and unloading facilities

~~It has been found that~~Review of the literature relating to monitoring of air quality in rail corridors carrying coal trains ~~highlighted~~reveals a recurring theme. Dust levels were generally found to increase during and immediately after the passing of a train, be it a loaded coal train, unloaded coal train, freight train or passenger train. Some studies suggest that highest dust levels are associated with loaded and unloaded coal trains; however, the magnitude of differences in dust levels between train types was not substantial.[9] This impact is very difficult to quantify.

5.2.1.3 Evaluation of Control of Fugitive Dust from Rail Cars

Dust mitigation for open coal filled rail cars. The Project Proponents propose to cover the rail cars to reduce fugitive dust during transport from Utah to Oakland and during staging of train cars waiting in the Port Railyard for unloading at the OBOT Terminal. However, there is a lack of

[8] Letter dated Sept. 21, 2015 from EarthJustice, Exhibit B – Environmental, Health and Safety Impacts of the Proposed OBOT by P. Fox, PhD, PE. And in Exhibit C – Technical Memorandum: Air Quality, Climate Change and Environmental Justice Issues from Oakland Trade and Global Logistics Center by Sustainable Systems Research, LLC by Prof. D. Niemeier; D. Rowangould, PhD and M. Eldridge (OAK055094).

[9] Katestone Environmental Pty. Ltd. And NSW EPA. 2014. *Literature Review of Coal Train Dust Management Practices*. Prepared for NSW Environment Protection Authority. December 2014. Available at: http://www.epa.nsw.gov.au/resources/epa/coaltrain-litreview.pdf

evidence to demonstrate the reliability and effectiveness of these air pollution controls to mitigate fugitive dust from coal filled rail cars arriving in West Oakland after a long distance trip from the mine in Utah. Specifically to summarize what was noted earlier in Chapter 2 of this report:

(1) *Dust Suppressants or Surfactants*: There is a lack of scientific data proving the continuous effectiveness of topping agents or surfactants to reduce Utah coal dust emissions from open rail cars during a complete long distance rail trip over mountainous terrain (over 700 miles) from Utah to Oakland, California. As well, a peer reviewed journal article by Jaffe et al.[10] cited by several public commenters states that "we are unaware of any studies reported in the scientific literature that evaluate the effectiveness of the BNSF surfactant and the impact of the reduction in coal dust upon air quality."

(2) *Rail Car Covers*. There is a lack of published scientific data for field testing in the U.S. proving the effectiveness of rail car covers to reduce fugitive dust from Utah coal and there is a lack of evidence of the commercial availability of rail car covers and of experience with their use for controlling fugitive dust from coal rail cars.

Comment [JS3]: Arent there studies indicating that coal in covered cars is subject to spontaneous combustion? Seems relevant here. I will look before 2 pm.

(3) *Requirements*. There are no enforceable provisions ~~to require~~requiring the coal supplier, Terminal developer, or Terminal operator to ~~utilize either a topping~~use topping agents or rail car covers for coal from Utah (although there are BNSF requirements for coal exported from Wyoming and Montana).

Coal dust reductions assuming a topping agent (surfactant). If fugitive coal dust generation from uncovered coal cars could be mitigated by a topping agent (surfactant) that was effective at the 85% estimated control rate, there would still be emissions of fugitive coal dust and increased fine particulate air pollutants in Oakland and Emeryville. This assumes a topping agent can remain effective over 750 miles to reduce fugitive coal dust blowing from the top of the car by 85%. ~~we~~We estimate that this would result in 370 tons of emissions of coal dust per year in California, and emissions of 6 tons of coal dust per year (or 32 lbs per day) in West Oakland. For the 1-mile trip through the southern portion of the adjacent neighboring city of Emeryville, we estimate these emissions to this area would be about 2 tons per year, or 11 lbs per day of fugitive coal dust.

In prior studies the amount of settling of the coal within the rail car that occurs on the trip between the mine and the port offers challenges to the structural integrity of chemical binders (or topping agents or surfactants). Norfolk & Southern's consultant cited their findings that such settling often leads to the cracking and ultimate failure of chemical binders. And in subsequent evaluations by Norfolk & Southern's consultant they have found that 85% crust retention does not necessarily produce an 85% emission reduction of dust. Without data for the percentage

[10] [HYPERLINK "http://www.sciencedirect.com/science/article/pii/S1309104215000057"]. Daniel et al. 2015. Diesel particulate matter and coal dust from trains in the Columbia River Gorge, Washington State, USA. [HYPERLINK "http://www.sciencedirect.com/science/journal/13091042" \o "Go to Atmospheric Pollution Research on ScienceDirect"]. [HYPERLINK "http://www.sciencedirect.com/science/journal/13091042/6/6" \o "Go to table of contents for this volume/issue"], November 2015, Pages 946–952. [HYPERLINK "http://www.sciencedirect.com/science/article/pii/S1309104215000057"]

reduction in fugitive coal dust that can be demonstrated in practice from the use of topping agents, neither public commenters nor ESA were able to make a credible estimate of the dust reduced from its application. In addition, the application of a topping agent would not be able to reduce the coal dust escaping from the bottom of the rail car during transport (worst case emissions of 0.4 lbs per car per mile of bottom dust of 1 lb per car per mile for bituminous coal, Norfolk & Southern).

Comment [TR4]: Add reference detail

Potential Dust Control

If these uncontrolled emissions of fugitive coal dust from rail cars were able to be reduced by surfactants or by coal car covers during long haul transport and local staging/transit on the spur, current coal car dust reduction requirements that are applicable elsewhere aim for reductions of 85%. The use of spray on surfactants on coal causes a crust to form on the top layer of coal in the rail car, with the intention that it remain intact during the rail trip to control fugitive coal dust releases. As mentioned below, ~~in~~ evaluations by Norfolk & Southern's consultant ~~they~~ found that 85% crust retention does not necessarily produce an 85% emission reduction of coal dust. None of the public commenters provided estimates of any coal dust reductions. To provide a comparison, here, ESA estimated potential reductions in coal dust emissions assuming an 85% reduction and provides the results in Table 35-2.

The application of a topping agent would not reduce the coal dust escaping from the bottom of the rail car during transport; this dust settles to the bottom of the car and escapes through the rapid discharge doors on the bottom of the rail car. This type of release has previously been estimated at 45 lbs per rail car for a 400 mile trip per BNSF (about 9 lbs per car/mile) for sub-bituminous coal from Wyoming and Montana; however, this rate does not compare well with other observations of rail car dust from hauling similar bituminous coal.[11] Based upon measurements by railroads and the National Coal Transportation Association (NCTA), the NCTA references an average for coal dust emissions from the bottom of rail cars rate to be 0.09 lbs/car/mile with a worst case of 0.40 lbs/mile (NCTA 2007). This release can be decreased with adjustment of the doors.[12]

Table 5-2. Estimated Fugitive Coal Dust Emissions Remaining After Control From Open Rail Cars During Transport From Utah to the Port Railyard, Oakland, CA for Delivery at OBOT

(Assumes emissions reductions of 85%)			tons per year			lbs per day		
Coal dust emission factor source	Trip Description	Approximate Trip length (mi)	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
Norfolk &	California	200	819	385	58	4,525	2,127	319

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[11] ibid

[12] NCTA Report 2007 cited in http://www.blm.gov/style/medialib/blm/wy/information/NEPA/hpdo/south_gillette/feis.Par.57426.File.dat/vol1.pdf

Southern	BAAQMD	77	315	148	22	1,742	819	123
	Oakland	3	12	6	1	68	32	5
	Emeryville	1.3	5	3	0.4	29	14	2
	San Leandro	3.6	15	7	1	81	38	6

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~~Table 2-2. Estimated Fugitive Coal Dust Emissions Remaining After Control From Open Rail Cars During Transport From Utah to the Port Railyard, Oakland, CA for Delivery at OBOT~~

~~(Assumes emissions reductions of 85% from top; 0% reduction from bottom)~~			~~tons per year~~		~~lbs per day~~		
~~Coal dust emission factor~~	~~Trip Endpoint~~	~~Approximate Trip length (mi)~~	~~TSP~~	~~$PM_{2.5}$~~	~~TSP~~	~~PM_{10}~~	~~$PM_{2.5}$~~
~~Norfolk & Southern~~	~~California~~	~~200~~	~~2,273~~	~~44~~	~~12,454~~	~~5,853~~	~~678~~
	~~Oakland~~	~~3~~	~~34~~	~~2.48~~	~~186~~	~~87~~	~~13.6~~
	~~Emeryville~~	~~1.3~~	~~15~~	~~1.04~~	~~81~~	~~37~~	~~6.1~~
	~~San Leandro~~	~~4~~	~~45~~	~~3.64~~	~~249~~	~~117~~	~~17.5~~

Contributions of fugitive coal dust to local $PM_{2.5}$ levels. As mentioned in Section 2, based upon uncovered rail cars carrying coal along a mainline rail route, a November 2015 ~~very recent~~ study cited by commenters and authored by Jaffe et al. concluded that:

> "Statistically higher peak PM2.5 concentrations during passage of coal trains compared to freight trains. Passage of a diesel powered open-top coal train results in nearly twice as much respirable $PM_{2.5}$ compared to passage of a diesel-powered freight train."[13]

Jaffe et al. found average $PM_{2.5}$ contributions of 8.8 and 16.7 $\mu g/m^3$, respectively, for freight and coal trains in urban locations in Washington state near the local terminal for export of these commodities. He concludes this implies that the coal train $PM_{2.5}$ emissions consist of approximately half DPM (from fuel consumption) and half coal dust. As well, the significant contribution of coal dust to the $PM_{2.5}$ concentrations collected during the passage of the coal

[13] [HYPERLINK "http://www.sciencedirect.com/science/article/pii/S1309104215000057"], Daniel et al. 2015. Diesel particulate matter and coal dust from trains in the Columbia River Gorge, Washington State, USA. [HYPERLINK "http://www.sciencedirect.com/science/journal/13091042" \o "Go to Atmospheric Pollution Research on ScienceDirect"]. [HYPERLINK "http://www.sciencedirect.com/science/journal/13091042/6/6" \o "Go to table of contents for this volume/issue"], November 2015, Pages 946–952 [HYPERLINK "http://www.sciencedirect.com/science/article/pii/S1309104215000057"]

trains was demonstrated in the Jaffe study through concentrations in particle samples, particle size differences and statistical analysis. Thus, it was demonstrated in these field studies that peaks of $PM_{2.5}$ from fugitive coal dust from uncovered rail cars during rail transport increased local concentrations of $PM_{2.5}$.

At this average emissions level of $PM_{2.5}$, if 16.7 $\mu g/m^3$ of total particulates from fugitive coal dust from rail transport on the mainline were added to the existing background levels ~~-~~that average 8 $\mu g/m^3$ in West Oakland, the new level would total 24.7 $\mu g/m^3$ causing an additional exceedance of the state and federal 24-hour ambient air quality standard for $PM_{2.5}$ (12 $\mu g/m^3$) and also contributing to local health effects.

Comment [TR5]: Jaffee numbers likely based on trains traveling at higher speeds, which means higher levels of DPM and dust emissions. Please add caveat or delete altogether. I don't think we can justify this without modeling.

Health effects of fugitive coal dust. Public commenters noted that there are significant public health concerns related to transporting coal by rail through densely populated areas adjacent to the rail corridor, including areas that are predominantly disadvantaged communities, such as West Oakland and Emeryville.[14] Scientific research points to potential public health hazards related to coal dust. Inhalation of fugitive coal dust could result in heart and lung issues, cancers, childhood growth and development problems.[15]

Comment [TR6]: Not a sentence. Header?

Public commenters noted that scientific studies in peer reviewed journals have demonstrated that there is a clear causal relationship between both very short (a day or multiple days) and longer-term (several months to years) exposure to $PM_{2.5}$ and a wide range of adverse health outcomes.[16] This commenter and others cited numerous studies from around the world and from California demonstrating that $PM_{2.5}$ is associated with respiratory symptoms, school and work loss, asthma exacerbation, emergency room visits, non-fatal heart attacks, adverse birth outcomes (premature births, low birth weight), hospital admissions, and death from cardiovascular disease. The populations at greatest particular risk (though other groups are susceptible) include children, asthmatics and older individuals with pre-existing cardiovascular or respiratory disease.

ESA found that numerous epidemiologic studies have documented associations between long-term exposure to fine particulate matter $PM_{2.5}$ and increased ~~mortality~~ death rates in urban populations in the U.S. (e.g., [HYPERLINK "http://ehp.niehs.nih.gov/15-09777/" \l "r6"]; [HYPERLINK "http://ehp.niehs.nih.gov/15-09777/" \l "r9"]; [HYPERLINK "http://ehp.niehs.nih.gov/15-09777/" \l "r10"]; [HYPERLINK "http://ehp.niehs.nih.gov/15-09777/" \l "r21"]; [HYPERLINK "http://ehp.niehs.nih.gov/15-09777/" \l "r34"]; [HYPERLINK "http://ehp.niehs.nih.gov/15-09777/" \l "r35"]; [HYPERLINK "http://ehp.niehs.nih.gov/15-09777/" \l "r38"], [HYPERLINK "http://ehp.niehs.nih.gov/15-09777/" \l "r36"], 2004).

For California, numerous peer reviewed studies from technical journals were cited by public commenters showing some of these health effects. Globally, the World Health Organization (WHO) estimates that roughly 3 million people die each year as a result of outdoor ambient

[14] Letter dated July 30, 2015 from Union of Concerned Scientists. (OAK058414)
[15] Letter dated July 30, 2015 from Union of Concerned Scientists. (OAK058414)
[16] Undated Testimony by Dr. Bart Ostro, Former Chief of the Air Pollution Epidemiology Section, California Environmental Protection Agency (retired). (OAK055095)

particulate matter air pollution exposures ([HYPERLINK "http://ehp.niehs.nih.gov/15-09777/" \l "r50"]), indicating that air pollution is one of the world's largest single environmental health risks. ARB estimates for California range from 10 to 30 thousand deaths per year depending on the assumptions in the analysis and the air standard used. These studies were cited by several commenters.

In Table 5-2 we ~~cite~~ identify the specific references cited ~~mentioned~~ above that provide additional peer reviewed scientific journal articles and additional technical documents from the American Heart Association, the U.S.EPA, and other sources that ~~s related to~~ demonstrate ~~ing~~ the evidence for significant health effects of particulate air pollution, especially fine particulates.

Comment [TR7]: This paragraph is a little unclear.

Table 5-2. Additional Scientific Studies Documenting the Health Effects of Particulates

•	Brook RD, Rajagopalan S, Pope CA III, Brook JR, Bhatnagar A, Diez-Roux AV, et al. 2010. Particulate matter air pollution and cardiovascular disease: an update to the scientific statement from the American Heart Association. Circulation 121:2331–2378.
•	Dockery DW, Pope CA III, Xu X, Spengler JD, Ware JH, Fay ME, et al. 1993. An association between air pollution and mortality in six U.S. cities. N Engl J Med 329:1753–1759.
•	Eftim SE, Samet JM, Janes H, McDermott A, Dominici F. 2008. Fine particulate matter and mortality: a comparison of the Six Cities and American Cancer Society cohorts with a Medicare cohort. Epidemiology 19:209–216.
•	Krewski D, Burnett RT, Goldberg MS, Hoover K, Siemiatycki J, Jerrett M, et al. 2000. Reanalysis of the Harvard Six Cities Study and the American Cancer Society Study of Particulate Air Pollution and Mortality: Investigators' Report. HEI Special Report 2000-01-01. Cambridge, MA:Health Effects Institute.
•	Ostro B, Lipsett M, Reynolds P, Goldberg D, Hertz A, Garcia C, et al. 2010. Long-term exposure to constituents of fine particulate air pollution and mortality: results from the California Teachers Study. Environ Health Perspect 118:363–869, doi: [HYPERLINK "http://dx.doi.org/10.1289/ehp.0901181"].
•	Ozkaynak H, Thurston GD. 1987. Associations between 1980 U.S. mortality rates and alternative measures of airborne particle concentration. Risk Anal 7:449–460.
•	Pope CA III, Burnett RT, Thun MJ, Calle EE, Krewski D, Ito K, et al. 2002. Lung cancer, cardiopulmonary mortality and long-term exposure to fine particulate air pollution. JAMA 287:1132–1141.
•	Pope CA III, Burnett RT, Thurston GD, Thun MJ, Calle EE, Krewski D, et al. 2004. Cardiovascular mortality and long-term exposure to particulate air pollution: epidemiological evidence of general pathophysiological pathways of disease. Circulation 109:71–77.
•	Pope CA III, Thun MJ, Namboodiri MM, Dockery DW, Evans JS, Speizer FE, et al. 1995. Particulate air pollution as a predictor of mortality in a prospective study of U.S. adults. Am J Respir Crit Care Med 151(3 pt 1):669–674.
•	WHO. 2014. 7 Million Premature Deaths Annually Linked to Air Pollution. Available: [HYPERLINK "http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/"].

5.2.2 Staging for Unloading and Spur Transport to OBOT

5.2.2.1 Overview

This section addresses the impact of staging of the~~se~~ four segments of the coal unit trains at the Port ~~railyard~~ Railyard while waiting unloading at the ~~main~~ OBOT ~~Terminal~~. The timing and sequence of the movement of the rail cars from the Port Railyard to the OBOT is based on the

"Preliminary Simulation" prepared for the Project Proponents by HDR.[17] Coal unit trains of 104 cars are to be separated into four segments of 26 cars each upon arrival at the ~~new~~ Port ~~of Oakland railyard~~ Railyard in West Oakland. The first 26-car segment is then transported from the railyard to the OBOT unloading facility by a switcher locomotive. Once the rail cars are unloaded, the switcher returns the empty 26-car segment to the Port Railyard and picks up the second 26-car segment for transport to the OBOT. The process continues until all four 26-car segments have been unloaded at the OBOT. The simulation assumes 2 hours total for switching and 5.2 hours for unloading, resulting in a total unloading time for each unit train of 7.2 hours. This excludes the time required to reassemble the empty trains and prepare for departure.

5.2.2.2 Evaluation ~~Fugitive Dust from Staging for Unloading~~

Based upon the analyses in Section 2, ESA found that Project Proponent's proposed use of covers for rail cars or alternatively, dust suppressants (surfactants) represent currently unproven methods for consistently controlling fugitive coal dust from rail cars during the staging of segments of the coal unit trains at the railyard while awaiting unloading at the OBOT Terminal in West Oakland.

Thus, ESA is unable to determine that fugitive coal dust emissions will be controlled during staging for unloading. In the analysis below we have estimated the anticipated uncontrolled emissions of fugitive coal dust from staging for unloading that would occur at the project site and that would be dispersed within West Oakland and southern Emeryville.

Multiple commenters noted the potential for uncontrolled fugitive coal dust emissions once the coal loaded rail cars arrive at the new Port Railyard and are staged awaiting unloading along with a trip up the new rail spur for unloading at the OBOT Terminal.[18]

One commenter provided estimates for fugitive coal dust emissions from uncovered coal cars in the staging area and rail spur transit. For about 5 million tons of coal delivered per year to OBOT, using standard air quality factors, the commenter predicted emissions into West Oakland of 323 tons per year of fugitive coal dust (TSP or total suspended particulates).[19] This translates to 1,770 lbs per day of fugitive coal dust in TSP or 125 lbs per day of $PM_{2.5}$.

ESA presents ~~these~~ the commenter estimates ~~here~~ in Table 5-3 along with ESA's revised estimates. ESA's revised estimates use the same U.S. EPA AP-42 emission factors as was used by the commenter, but adjusts those estimates. The adjustments included revising the number of railcars per day to 156 (commenter assumed 300) and adjusting the peak wind speed downward from that used by the commeter

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[17] BoD. (OAK054829)

[18] Letter dated July 30, 2015 from Union of Concerned Scientists. Letter dated September 2, 2015 from Earth Justice (OAK058414). Letter dated Sept. 21, 2015 from EarthJustice, Sierra Club, West Oakland Environmental Indicators Project, San Francisco Baykeeper and Communities for a Better Environment. (OAK055094). Testimony dated September 21, 2015 by Prof. J. Ansar, Mills College. (OAK055095)

[19] Letter dated Sept. 21, 2015 from EarthJustice, Exhibit C – Technical Memorandum: Air Quality, Climate Change and Environmental Justice Issues from Oakland Trade and Global Logistics Center by Sustainable Systems Research, LLC by Prof. D. Niemeier; D. Rowangould, PhD and M. Eldridge. (OAK055094).

Table 5-3. Estimated Fugitive Coal Dust Emissions From Staging of Rail Cars at the Port Railyard, Oakland, CA and Transit on Spur for Unloading at OBOT

	tons/yr			lbs/day		
	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
Commenter Estimate*	323	NC	NC	1,770	NC	125
ESA Estimate**	156	78	11.7	889	445	67

*Earthjustice, 2015.
**Emissions estimated using similar approach as Earthjustice (2015) but adjusted to account for 1.5 trains per day at 104 railcars per train and to include updated wind speed.

Assuming that the coal covers or surfactant could reduce these above emissions by 85% (the amount required for Wyoming coal), ESA calculated the remaining uncontrolled emissions based on the commenter's estimate and using ESA's estimate. Those controlled emissions are shown in Table 5-4.

Table 5-4. Estimated Fugitive Coal Dust Emissions Remaining After Control From Staging of Rail Cars at the Port Railyard, Oakland, CA and Transit on Spur for Unloading at OBOT

	tons/yr			lbs/day		
	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
Commenter Estimate*	48	NC	NC	266	NC	19
ESA Estimate**	23	12	2	133	67	10

*Emissions are those shown in Earthjustice, 2015 but reduced by 85 percent to account for use of surfactants or coal covers.
**Emissions are based on the ESA's adjusted emissions shown in Table 5-3 but further reduced by 85 percent to account for the use of surfactants or coal covers.

~~**Table 5-3. Estimated Fugitive Coal Dust Emissions From Staging of Rail Cars at the Port Railyard, Oakland, CA and Transit on Spur for Unloading at OBOT**~~

	~~tons/yr~~		~~lbs/day~~	
	~~TSP~~	~~$PM_{2.5}$~~	~~TSP~~	~~$PM_{2.5}$~~

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Comment [TR8]: Niemeier uses the correct approach from AP-42 except for two problems 1) She assumes 6 trains per day at 50 cars per day, which is 50% higher than what we've assumed and 2) She uses an incorrect wind speed (65 mph) to estimate dust emissions. Dan Sloat says that AP-42 recommends using 2-minute average peak wind gust, which is 40 mph for Oakland, not 65 mph, which is Oakland's peak wind gust.

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~~Staging, Spur Trip*~~	~~223~~	~~NC~~	~~1,770~~	~~125~~

Comment [TR9]: For Tables 5-1 and 5-2, we also show PM10. We should be consistent and show PM10 in 5-3 and 5-4.

~~Assuming that the coal covers or surfactant could reduce these above emissions by 85% (the amount required for Wyoming coal), ESA calculated the remaining uncontrolled emissions at xxx tons per year of PM with x tons per yr of PM2.5 (xx lbs per day of PM and x lbs/day of PM2.5). These results are summarized in Table 5-4.~~

~~Table 5-4. Estimated Fugitive Coal Dust Emissions After 85% Control For Staging of Rail Cars at the Port Railyard, Oakland, CA and Transit on Spur for Unloading at OBOT~~

	~~tons/yr~~		~~lbs/day~~	
	~~TSP~~	~~$PM_{2.5}$~~	~~TSP~~	~~$PM_{2.5}$~~
~~Staging, Spur Trip*~~	~~275~~		~~1505~~	~~106~~

~~*assumed a straight line 85% reduction from use of controls~~

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Dust from staging of rail cars and transit on the spur could also be re-suspended and increase particulate levels, degrading local air quality. As mentioned above, this impact is very difficult to quantify. However, due to the estimated volume of fugitive coal dust, ~~the levels of local coal dust accumulated from~~ rail transport~~,~~ and the coal dust from staging of rail cars and transit on the spur, particulate levels could be significant. In addition, dust resuspension or re-entrainment could make an additional contribution to increasing local ambient PM10 and PM2.5.

5.2.3 Unloading of Coal

5.2.3.1 Overview

The Project Proponent is proposing to use bottom-release rail cars designed to ~~release~~ unload the commodities, including coal, into a deep underground transfer compartment with dust collection systems installed for dust mitigation. Coal and/or petcoke is proposed to be moved within the OBOT ~~Terminal~~ in enclosed conveyance systems with dust control and collection technology. Various commodities would be transferred via a completely covered and contained system of fully encapsulated conveyors.

5.2.3.2 Evaluation

These control measures are currently in use in the San Francisco Bay Area and at some locations within the South Coast Air Quality Management District. Use of these control measures for fugitive coal dust would likely be considered Best Available Control Technology in the San Francisco Bay Area. Dust control levels are estimated at over 90%.

Comment [TR10]: Is there a source for this? Can we reference our discussion with BAAQMD that the BACT measures that would be required would achieve a minimum of 90% control and likely would achieve 99% control.

Using standard US EPA AP-42 procedures, ESA performed a screening level calculation that provided a preliminary estimates of 12 tons per year of fugitive coal dust as total particulates (TSP) and 0.9 tpy of $PM_{2.5}$ for coal unloading within the proposed enclosed building where bottom dumping coal cars are to be unloaded. This converts to emissions of 65 lbs/day of TSP and 5 lbs/day of $PM_{2.5}$. These estimates are shown below in Table 5-5.

Table 5-5. Estimated Controlled Fugitive Coal Dust Emissions From Unloading, Storage, ~~and~~ Transfer, and Transloading of Coal at OBOT

	tons/yr		lbs/day	
	TSP	$PM_{2.5}$	TSP	$PM_{2.5}$
Unloading	12	0.9	65	5
Storage	3	0.23	18	1.3
Transfer	10	0.75	57	4
Transloading	12	0.86	65	5

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Comment [TR11]: PM10 estimates needed? Are calculations provided here or in appendix? Also, should we add references and totals to this table.

5.2.4 Storage

5.2.4.1 Overview

A rectangular building is proposed by Project Proponent's for storage of coal and petcoke as Commodity A. Two rectangular storage buildings for the stockpiles are to be constructed with a metal truss frame and a fabric cover or skin.

5.2.4.2 Evaluation

Storage domes are currently in use in the San Francisco Bay Area for storing petcoke and coal. Use of storage domes for fugitive coal dust control would likely be considered Best Available Control Technology by the BAAQMD. Dust control levels are estimated at over 90% for storage domes.

Comment [TR12]: Same comment. Need reference.

ESA performed a search of dust control effectiveness estimates for experience with coal storage using a rectangular building with a fabric cover and found that these were not readily available in public documents or technical journals.

Using standard US EPA AP-42 procedures, ESA performed a screening level calculation that provides a preliminary estimate of 3 tons per year of fugitive coal dust as total particulates (TSP) and 0.23 tpy of $PM_{2.5}$ for storage within the proposed enclosed building. This converts to emissions of 18 lbs/day of TSP and 1.3 lbs/day of $PM_{2.5}$. These estimates are shown above in Table 5-5.

5.2.5 Transfer to Storage and Shiploaders via Conveyors

5.2.5.1 Overview

As described in Section 2, after rail cars are unloaded, commodities are to be transferred from the unloading facility to the storage building and then to ship loaders. These transfers ~~are to~~would occur using encapsulated conveyors. Commodity A, presumed to be coal, is planned to be handled in this manner at OBOT.

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5.2.5.2 Evaluation

Enclosed conveyors are currently in use in the San Francisco Bay Area for storing petcoke and coal. Use of enclosed conveyors for fugitive coal dust control would likely be considered Best Available Control Technology by the BAAQMD. Dust control levels are estimated at over 90% for enclosed conveyors.

Comment [TR13]: Source?

Using standard US EPA AP-42 procedures, ESA performed a screening level calculation that provides a preliminary estimate of 10 tons per year of fugitive coal dust as total particulates (TSP) and 0.75 tpy of $PM_{2.5}$ for transfer activities via encapsulated conveyors. Emissions are expected at transfer points. This converts to emissions of 57 lbs/day of TSP and 4 lbs/day of $PM_{2.5}$. These estimates are shown above in Table 5-5.

5.2.6 Transloading to Ships

5.2.6.1 Overview

As described in Section 2, commodities are to be loaded onto ships using enclosed ship loaders with dust control. Shiploading of Commodity A (presumed to be coal) ~~ship loading~~ is to be accomplished with the use of dual telescoping quadrant ship loaders that are each equipped with loading spoons for hatch trimming, and designed to accommodate wash down of system between shipments.

5.2.6.2 Evaluation

Use of this type of ship loader for fugitive coal dust control would likely be considered Best Available Control Technology by the BAAQMD. Dust control levels are estimated at over 90% for this technology.

Comment [TR14]: Source?

Using standard US EPA AP-42 procedures, ESA performed a screening level calculation that provides a preliminary estimate of 12 tons per year of fugitive coal dust as total particulates (TSP) and 0.86 tpy of PM2.5 for transloading. This converts to emissions of 65 lbs/day of TSP and 5 lbs/day of PM2.5. These estimates are shown above in Table 5-5.

5.2.5 Conclusions

5.2.5.1 Mainline Rail Transport, Staging, and Spur Transit ~~port~~ to OBOT

Based upon information available in the public commenters' estimates and ESA's emissions calculations for rail transport, staging and transit on the spur, the uncontrolled emissions of fugitive coal dust (total particulates) in West Oakland and southern Emeryville from uncovered coal unit trains would exacerbate already poor air quality and would likely add to the existing number of exceedances of the California and federal $PM_{2.5}$ ambient air quality standards. These emissions could also contribute to substantial endangerment by adding to health issues experienced by residents living in West Oakland and southern Emeryville. If a southerly route for rail transport is used, the emissions of fugitive coal dust would be deposited within western San Leandro.

All three ~~Both~~ of these areas of impact are designated as disadvantaged communities by CalEPA due to being ~~already~~ disproportionately burdened by and vulnerable to multiple sources of air and other categories of pollution. In West Oakland, southern Emeryville, and western San Leandro the added coal dust emissions could negatively impact public health in each of these three areas where higher than average rates of asthma and cancer are already present (as demonstrated in CalEPA compiled data).

Regardless of the rail route taken to OBOT, the coal unit trains will be using the new Port railyard for staging and the spur for travel to OBOT for unloading. Within 1000 feet of the new Port railyard, there are sensitive receptors in the West Oakland area that would be directly affected: two schools, a child care center and park areas next to I-880. These same sensitive receptors are within ½ mile of the rail spur. All of these areas are adjacent neighbors to the new Port railyard and to the rail spur.

~~Also,~~ The Oakland Toll Plaza for the Bay Bridge is ~~also~~ located within 1000 feet of the OBOT Terminal and unloading facility. In addition, the newly opened East Bay Regional Parks District's Alexander Zuckermann Bicycle and Pedestrian Path is located within 1000 feet of the Terminal and unloading facility. The proposed expansion of the Parks District's pathway will connect to a segment of the Bay Trail on the spit of former Army Base property located at the east end of the bridge, immediately adjacent to the OBOT Terminal. This is planned to be transferred to the EBRPD from the City of Oakland for the development of Gateway Park. Additionally, public access to the Bay ~~to be located~~ directly west of the OBOT facility will be required by the Bay Conservation and Development Commission. All of these areas are adjacent neighbors to the OBOT unloading operations at the Terminal and the rail spur serving the Terminal.

Although no emission estimates were provided in their report, HDR concludes that a "negligible" amount of fugitive coal dust would be deposited in West Oakland based on rail cars that are covered with a top or coated with a dust suppressant. ESA ~~respectfully~~ disagrees with this conclusion, since based upon the current lack of information available to confirm the effectiveness of rail car dust control.

Whether ~~assuming~~ uncontrolled or controlled, the coal dust emissions resulting from the staging area for loaded coal cars in the new Port Railyard and from transit on the rail spur to the unloading facility would be the largest contributor to local air pollutants from activities related to operation of the OBOT Terminal. The ~~estimated quantities of th~~ese emissions ~~will be in quantities that~~ would degrade local air quality.

Specifically, additional levels of fugitive coal dust emissions would increase levels of PM10 above existing levels and be expected to add to the existing number of exceedances of the PM2.5 standard as recorded in West Oakland. This would similarly affect southern Emeryville.

Although no estimates were provided in their report, HDR concludes that a "negligible" amount of fugitive coal dust would be deposited in West Oakland based on rail cars that are covered with a top or coated with a dust suppressant. ESA disagrees with this conclusion, based upon the lack of dust estimates and a control effectiveness estimates in HDR's report.

~~Nuisance i~~Impacts such as short-term visible dust and deposited ~~Deposited~~ coal dust could also cause nuisance impacts or ***amenity impacts*** (impacts on features that have value). Airborne coal dust is typically deposited on houses, cars, outdoor furniture, and other property; this typically includes the larger coal dust particles in the PM10 size range or larger. Among the amenity impacts most commonly reported are buildup of particulate matter on surfaces in residences and cars stored outside, resulting in the need to clean more frequently, and soiling of laundry dried outdoors (ref).

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5.2.5.2 Unloading, Storage, Transfer, and Transloading at OBOT

Table 5-6 summarizes estimated emissions for all of the sources that were discussed above in this section for rail transport of coal and all activities for export of coal at the OBOT facility.

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Table 5- 6. Summary of Emissions Estimates From Rail Transport, Staging/Spur Travel, Unloading, Storage, Transfer and Ship Lloading of Coal at OBOT

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	tons/yr		lbs/day	
Uncontrolled Emissions	**TSP**	**$PM_{2.5}$**	**TSP**	**$PM_{2.5}$**
Rail Transport				
Oakland	68	5	374	26
So Emeryville	29	2	162	11
San Leandro	91	6.4	498	35
Staging, Spur Trip	323	NC	1,770	125
Controlled Emissions				
Unloading	12	0.9	65	5

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Storage	3	0.23	18	1.3
Transfer	10	0.75	57	4
Transloading	12	0.86	65	5

Based upon the total uncontrolled and controlled emissions estimates for all activities associated with OBOT and the re-entrainment of accumulated fugitive coal dust, we conclude that these contributions of particulates to local levels of total PM, PM10 and PM2.5 could cause additional exceedances of ambient air quality standards and ~~to cause~~ substantial endangerment of the health of the adjacent neighbors in the disadvantaged communities of West Oakland, southern Emeryville and western San Leandro. ~~As well, other~~Other adjacent neighbors that ~~will~~could be affected ~~and/or that could also be~~ substantially endangered are users of the adjacent EBRPD path and new park, commuters and workers at the Oakland Bay Bridge Toll Plaza and users of the public access to the San Francisco Bay.

Within 1/2 mile of the proposed new rail spur and OBOT facility, there are sensitive receptors in the West Oakland area that would be directly affected: two schools, a child care center and park areas next to I-880. Also, the Oakland Toll Plaza for the Bay Bridge is located within 1000 feet of the OBOT Terminal and unloading facility. In addition, the newly opened East Bay Regional Parks District's Alexander Zuckermann Bicycle and Pedestrian Path is located within 1000 feet of the Terminal and unloading facility. The proposed expansion of the Parks District's pathway will connect to a segment of the Bay Trail on the spit of former Army Base property located at the east end of the bridge, immediately adjacent to the OBOT Terminal. This is planned to be transferred to the EBRPD from the City of Oakland for the development of Gateway Park. Additionally, public access to the Bay to be located directly west of the OBOT facility will be required by the Bay Conservation and Development Commission and is also within 1000 feet of the OBOT operations. All of these areas are adjacent neighbors to the OBOT ~~unloading~~ operations at the Terminal and the new rail spur serving the Terminal and could be substantially endangered by the expected increase in air pollutants.

5.3 Petcoke

5.3.1 Overview

Expected activities associated with the OBOT include rail transport of petcoke in open rail cars to the Port Railyard, staging of trains in the Port Railyard, travel along the new railroad spur from the Port Railyard to the OBOT Terminal for unloading, conveyor transfer to storage facilities and conveyor transfer to ships for export.

5.3.2 Evaluation

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Comment [TR15]: This table needs to be updated to show the new numbers that have been adjusted in Table 5-1 through 5-5, and should include PM10. Also, why are we showing uncontrolled and controlled emissions in the same table? We should explain why, i.e., controlled emissions are those subject to BAAQMD's jurisdiction and represent BACT, whereas uncontrolled emissions are due to federal preemption, which prevents controls from being enforced.

Comment [TR16]: Table needs to be updated to include emissions that would occur in California and BAAQMD. Also, this table shows South Emeryville, but Emeryville in Tables 5-1 and 5-2.

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Air Emissions. Of the two stockpiled fuel sources, coal and petcoke, the risk of fine PM blowing into surrounding neighborhoods is greater for petcoke.[20] This is due to an important difference between petcoke and coal: the silt content is 21.2% for petcoke compared to 4.6% for coal, as cited in one recent report prepared for the City of Chicago[21] This same study found that bulk material piles can in general be significant sources of dust and contribute to localized exceedances of ambient air quality standards in Chicago.

Comment [TR17]: This statement assumes equal amounts of coal and petcoke. It's doubtful that petcoke would be exported in the same amount as projected coal exports, so is petcoke really as much of a dust concern?
Can we say that exporting petcoke in amounts equal to 20% of expected coal exports would result in approximately the same amount of dust emissions due to petcoke's high silt content?

Thus, the air emissions of particulates are expected to be at least similar, if not greater, for petcoke as mentioned above for each of the coal related activities including at OBOT and the Port Railyard including Rail Transport, Train Staging, Unloading, Storage, Transfer, and Transloading.

...

Health Effects. EPA believes that significant quantities of fugitive dust from pet coke storage and handling operations present a health risk. EPA's research does not suggest that petroleum coke poses a different health risk than PM_{10}.[22] EPA is particularly concerned about particles that are 10 micrometers in diameter or smaller (referred to as PM_{10}) because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. While trace amounts of toxic materials have been measured in petroleum coke, studies on rats show that petroleum coke itself has a low level of toxicity and that there is no evidence of carcinogenicity.

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A recent review study in 2015 concluded that the main threat to urban populations in the vicinity of petcoke piles is most likely the fugitive dust emissions in the form of fine particulate matter.[23] This study cited inhalation as the most prevalent concern, as black dust has observed to be blown off open piles under extreme weather conditions, and was found to accumulate on residential properties in the vicinity of stockpiled petcoke in Chicago and Detroit. They conclude that airborne petcoke dust has the potential to exacerbate pre-existing lung ailments, or may have additive or synergistic effects with other environmental toxins. This study cites among other studies, evidence of the existing impact in the neighborhood where petcoke is currently stored,

[20] CDM Smith. *City of Chicago Fugitive Dust Study, 2014*. Available online: http://www. cityofchicago.org/content/dam/city/depts/cdph/environmental_health_and_food/PetCoke_Public_ Comments/102512DustReport031314.pdf.

[21] CDM Smith. *City of Chicago Fugitive Dust Study, 2014*. Available online: [HYPERLINK "http://www"]. cityofchicago.org/content/dam/city/depts/cdph/environmental_health_and_food/PetCoke_Public_ Comments/102512DustReport031314.pdf.

[22] [HYPERLINK "https://www.epa.gov/petroleum-coke-chicago/health-effects-petroleum-coke"]

[23] Caruso, J.A., K. Zhang, N.J. Schroeck, B. McCoy and S.P. McElmurry 2015. Petroleum Coke in the Urban Environment: A Review of Potential Health Effects. *Int. J. Environ. Res. Public Health* **2015**, *12*, 6218-6231; doi:10.3390/ijerph120606218

South Deering in Chicago, Illinois and where this area has particularly higher than average rates of asthma, as do many of the surrounding neighborhoods of Southeast Chicago.[24]

For dust from petroleum coke, there are no specific occupational exposure limits for workers.

5.3.3 (Possible) Conclusions Regarding Petcoke

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The volume of emissions of fugitive pet coke dust in into the ambient air in the form of total suspended particulates (and PM_{10} and $PM_{2.5}$) are expected to be similar, if not greater, for petcoke. This is expected to occur as mentioned above for coal for each of the coal related activities at OBOT and the Port Railyard including Rail Transport, Train Staging, Unloading, Storage, Transfer, and Transloading. Thus, ~~the~~ these levels of fugitive pet coke emissions from OBOT activities will contribute to existing particulate concentrations in ambient air and similarly affect adjacent neighbors. The conclusions stated above for substantial endangerment of public health in local communities are applicable here. ~~health impacts are expected to be similar as those for coal discussed above.~~

Comment [TR18]: Can we say this without knowing the expected volume of petcoke that will be exported through OBOT?
Will OBOT have separate petcoke versus coal handling facilities?

[24] Gupta, R.S.; Zhang, X.; Sharp, L.K.; Shannon, J.J.; Weiss, K.B., The protective effect of community factors on childhood asthma. *J. Allergy Clin. Immunol.* **2009**, doi:10.1016/j.jaci.2009.03.039.